

# **TRAVEL BEHAVIOR ISSUES RELATED TO NEO-TRADITIONAL DEVELOPMENTS — A REVIEW OF THE RESEARCH**

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At first glance, it may seem odd to address telecommunications and land use at the same conference, but it actually makes a lot of sense. As Genevieve Giuliano noted they are in many ways about the same thing: providing more choices for people and expanding accessibility. Both topics have received a great deal of attention of late in the media and also from communities. In my own community, Austin, Texas, there is a lot of talk about both of these strategies as a way to address the growing congestion problems.

In my talk I will address what we know about how urban form influences travel behavior, but it will be as much about what we do not know as about what we do know. I will review the different kinds of studies that have been done, some of which have been mentioned by other speakers, and comment briefly about what seems to be emerging from those studies in terms of what they suggest about urban form and travel behavior. I will then outline the many kinds of questions that remain to be answered, and will end by reflecting on whether or not we are even asking the right questions, or whether we should be thinking about the relationship between urban form and travel behavior somewhat differently.

Most of the recent research in this area falls into one of three categories. The first set of studies are simulation studies. These studies use traditional transportation models to compare different street networks, or different layouts of land uses in terms of their impacts on travel. These studies do not empirically show the relationship between urban design and travel behavior, but they can be suggestive of the potential of urban design to shape travel patterns. These studies have focused on strategies such as transit-oriented development and rectilinear street grids.

The next set of studies I call aggregate studies. At the aggregate or macro level, studies look at differences in travel patterns between different types of communities. Perhaps this level of analysis is sufficient to enable planners to incorporate land use into our transportation models. The third set of studies addresses the micro or disaggregate level and explores how urban design influences individual choices about travel. These studies begin to get at the underlying mechanisms which explain how people make choices about travel and how urban design influences those choices. It is the micro or disaggregate level where we should focus our research efforts if we are to fully understand the underlying causality in travel patterns observed at the macro or aggregate level.

Aggregate studies typically involve cross-sectional comparisons of different types of neighborhoods and focus on average travel characteristics for the neighborhood. But there are important differences in these studies in terms of how urban form is characterized. Some studies use simple classifications: traditional pre-World War II neighborhoods versus conventional or typical post World War II neighborhoods. In some studies urban form is measured in a variety of ways and these measures are factored into the analysis of travel patterns. The studies also differ in terms of what aspects of travel are analyzed, whether it is total travel, or work travel, or nonwork travel, or whether it is trip frequency, trip distances, mode split, or total travel. As a result, these studies are not all necessarily approaching the problem the same way or testing the same relationships. My very crude simplification of what these studies show give an indication of the consistency of the results: less total VMT in neighborhoods with higher density and better transit access; less VMT and higher percentages of nonauto modes in neighborhoods that are more pedestrian oriented, higher density, transit oriented; higher percentages of transit use and other nonauto modes for all trip purposes in traditional neighborhoods versus standard suburban neighborhoods; higher percentages of transit use for work trips in some transit neighborhoods relative to automobile neighborhoods. Together these studies suggest a consistent pattern of less automobile travel and more transit use in traditional kinds of neighborhoods at least potentially. But what these crude simplifications mask is the complexity that begins to emerge from some of these studies. For example, in some of these studies not all of the urban design variables are significant, and others show that combinations of variables must be considered. One of Cervero's studies, for example, shows that the regional context is important in explaining travel patterns and that the character of the neighborhood is part of the explanation—you cannot just look at the neighborhood. These aggregate studies begin to suggest that the relationship between urban form and travel is more complex than it may seem on the surface.

Disaggregate studies, by contrast, analyze the travel behavior of individuals or households within the neighborhood in an effort to better understand individual travel choices and the role that urban design plays in individual choices. A better understanding of the mechanisms underlying individual choices will lead to a better understanding of the causal role that urban form plays. Typically, the analysis in these studies involves analysis of variance techniques which compare the variation within a neighborhood relative to variation between neighborhoods. Some of these studies use regression or logit models to compare the relative influence of different variables. Again, my very crude simplifications of the results of these studies suggest a pattern: more walking, but not necessarily less driving, to shopping for residents in traditional neighborhoods; lower time spent traveling for work related and nonwork related trips for residents in neighborhoods with higher accessibility; higher percentages of nonmotorized trips for residents closer to the bus or rail and higher density neighborhoods; higher percentages of nonautomobile trips for work and nonwork for residents in traditional neighborhoods; more walking to shopping and potentially less driving to shopping for residents in some traditional neighborhoods. Again the bottom line seems to be this pattern that there may be less driving, more walking, and more transit in traditional kinds of neighborhoods.

But these disaggregate studies reveal even greater complexities than did the aggregate studies. It is almost like peeling an onion: as each layer is peeled, another layer is found. The more research we do, the more questions we find, and the more we discover that the link between urban form and travel

behavior is much more complex than we thought. One complexity that emerges is the trade-off between trip frequency and trip distance; if distances are short you may make more trips. Another complexity is the importance of the neighborhood context, not just how the neighborhood is designed, but what surrounds the neighborhood. Yet another complexity is the importance of attitudes about travel and urban design and other matters as well. Typically these studies have produced relatively low R squared values, on the order of .20 to .25, which suggest that these models leave most of the variation unexplained, suggesting that there is still much that we do not understand about travel choices and the role of urban design in travel choices.

So, although the research suggests that automobile use is lower in traditional neighborhoods, it also suggests there are numerous questions we need to answer before we fully understand why, or even before we can be sure that the patterns that we seem to be seeing are truly meaningful. The first question is: What aspects of urban form influence travel choices. We see differences in traditional neighborhoods versus standard suburban neighborhoods, but what is it about traditional neighborhoods that is leading to the differences in travel choices that we see? This question must be answered if our research is to help guide land use and urban design codes and policies. More detailed kinds of research are needed to help determine what it is about urban design, what specific characteristics or sets of characteristics, lead to the observed differences in travel behavior.

Another important question is how to measure design. The simple answer is that it should be measured in terms of what really matters to people. For example, does it matter that it is a rectilinear grid, or is what matters the fact that distances are shorter and there are more choices of routes to get someplace? Is that what is important about a traditional neighborhood? Many studies focus on density, but is it density that matters? No, probably not. Probably what matters is what goes along with density: shorter distances to activities, better transit service, and other sorts of characteristics. Instead of relying on simple measures of urban form, researchers must develop measures that reflect what really matters to people.

A third question is what aspects of urban form influence what aspects of travel. Different trip purposes are influenced by urban form in different ways: work versus nonwork trips, or different kinds of nonwork such as shopping trips versus medical trips, for example. Different aspects of travel will also be influenced in different ways: the choice to make a trip, the choice of destination, the choice of when to make a trip, the choice of what mode.

The relative importance of place characteristics versus person characteristics is another important question. What role do socioeconomic factors play in our travel choices? What role do attitudes and our experiences play? Are the observed differences between neighborhoods due to the people who live in the place? A related question is the relationship between short- and long-term choices, in particular the choice about where to live. Are the observed differences in these neighborhoods the result of certain kinds of people choosing to live in certain kinds of neighborhoods? If so, it does not mean that there is not a connection between urban design and travel; it means that there is more of an indirect connection than we may think.

Another important issue is when people decide what they are going to do, they decide based on their perceptions of the place and not necessarily what can be objectively observed about a place. For example, one place may feel perfectly safe and comfortable to one person and not to another, and so their perceptions of the place influence what they decide about travel.

Adaptability and flexibility in travel choices leads to two key questions about the relationship between urban form and travel. First, does a change in urban form lead to change in behavior? If a city puts in more sidewalks or a new local store opens, will this lead to changes in travel behavior? None of the research so far addresses this issue directly. The second question is the possibility of substitution. If you walk to the store, is it in place of driving to the store, or is it in addition to driving?

A final question is whether or not there are geographic differences in the relationship between urban form and travel. Most of this research has been conducted in the San Francisco Bay area, or elsewhere on the west coast, although a number of recent studies have come from elsewhere. It would be interesting to see if the same kinds of patterns are observed in different kinds of places.

Why haven't researchers answered these questions or even gone very far toward answering them? One problem is insufficient land use data to make more detailed analysis or to explore a variety of measures of urban form. But collecting this kind of data is time consuming and expensive. Travel data are also a problem, in that these travel diary surveys include so few households within any one neighborhood that it almost necessitates primary data collection to get enough travel data for the few neighborhoods for which the study can afford to collect the necessary land use data. In addition, it is important to collect data designed specifically to address these questions: attitudinal questions should be included in travel diary surveys, stated-preference techniques might prove fruitful, and qualitative research could help to increase our understanding of these issues and of the underlying causality.

It is also important to reconsider the broader question this research is intended to address. We can use urban design to alter travel behavior. One of the assumptions of the new urbanism movement is that by designing a place in a certain way, we will reduce the amount of driving that people do. But mostly likely, we are not going to see very much change as a result of these urban design strategies because of limits on the possibility of changing individual behavior and limits on the possibility of changing existing development. Think about what we have out there that we are not going to be able to fix. Given these limitations, the prevailing expectations of what urban form can do are much too high. One issue is that we can not be sure that travel changes are always going to be in the right direction. In my research in the Bay Area comparing two traditional neighborhoods with two conventional suburban neighborhoods, access to convenience stores, which is much higher in traditional neighborhoods, was clearly linked to a much greater frequency of trips to these convenience stores, but not to a reduction in the number of trips to supermarkets. This suggests that residents of these traditional neighborhoods are making extra trips: they make as many trips to the supermarkets as everybody else, but they also make these to convenience stores because they have that opportunity. At times, by enhancing accessibility and increasing opportunities, urban form policies may actually increase travel.

In a more recent study in Austin, of two traditional neighborhoods, two early modern neighborhoods, and two more recent late modern neighborhoods, we asked residents to think about the

last time they walked to a store and speculate as to what they would have done had they not been able to walk that day. Most people in all of the neighborhoods said that they would have driven to the same location or some other location if they had not walked that day, suggesting that most of these walking trips probably substitute for a driving trip; if people had not been able to walk, they would have driven. But some residents said that if they had not been able to walk, they would not have made the trip at all, suggesting that some of these walking trips are induced trips—induced by the opportunity to be able to walk to a store. So not all of the walking trips observed in traditional neighborhoods are substituting for driving; some of them are additional trips.

Another issue is that the changes that might occur because of urban design strategies are probably going to be small ones. In my Austin study 77 percent of walking trips to the store apparently substituted for a driving trip. Put that together with how frequently people make these walking trips: the highest case was a neighborhood in Austin where on an average residents made 6.3 walking trips to a store or local shopping area in a month. Take 77 percent of those 6.3 trips and assume a one-mile round-trip distance, which is probably generous for walking trips, and that means that in this neighborhood 4.8 miles of driving are saved per month per resident because of that opportunity to walk to a store. Better than nothing, but it is not going to have a big impact on the overall travel in the region.

A third issue is that the regional context, often forgotten in research, may provide more opportunities that mean more travel. In my Bay Area work, I also compared trips to regional shopping centers for two neighborhoods in the Silicon Valley area with access to numerous regional shopping centers, and the two in Santa Rosa with access to only two centers. In the Silicon Valley neighborhoods residents take advantage of their better accessibility: they do not just go to the closest center, they go to, on average, three or so different centers over a four-month period, and they take more trips. Put that together with distances to these centers and it appears that in total these residents are traveling much more than residents of the Santa Rosa neighborhoods.

All these issues suggests that there are real limits on how much we can expect to change travel through urban design. Does that mean we should not be concerned with this question of how urban design influences travel behavior? I would say no, we just need to ask the question somewhat differently. The important point is that research on this question will help to show how design can provide choices to do something other than drive. This means focusing on how design provides choices and not on how design changes behavior and looking at behavior not as an end in itself, but as a measure of the quality of the environment. If people are not walking, then it suggests that the opportunity to walk is not adequate in that place: if they are not taking transit, then the opportunity is not adequate in that place. This means flipping the question around and focusing not on a change in travel behavior as an end, but focusing on providing people with the choice to do something other than drive as the end.

It is easy to resign ourselves to the fact that people are going to choose to drive and that is the way it is going to be. But it is relatively clear that people value having other kinds of choices and we cannot simply assume that everyone wants the same thing. My studies, for example, consistently show that people walk and that they seem to like walking. In terms of strolling rather than walking to a store,

there are not significant differences between the different kinds of neighborhoods; everywhere you look, people are walking. This suggests to me that either the urban designers do not really know what makes for a good walking environment if residents walk in places that the urban designers would say are not good places to walk, or that residents are willing to overlook the negative aspects of their neighborhood because they enjoy walking so much, or some of both. When asked why do they walk, residents give numerous reasons: exercise, pleasure, walking the dog, walking to the store in cases where they have the opportunity. Very few residents say that they do not enjoy walking; it is something that people seem to value the opportunity to do. Surprisingly, some of the conventional neighborhoods had as high a frequency of walking to stores as some of the traditional neighborhoods. In places where urban designers would say nobody would ever want to walk residents are walking. If walking is something that people value, maybe researchers should be looking at how we can provide that opportunity for people. If they take advantage of it, great, if not, at least they have the choice. Let's not focus so much on how to change behavior, rather let's think about how to provide people with those opportunities.